Depending on the operating type of the printer or copier, a predetermined sheet separation is to be set between successive single sheets to be printed. To set the sheet separation, the sheet separation between two single sheets is measured, whereby given a deviation from a preset sheet separation the sheet separation for subsequent single sheets is controlled dependent on the deviation. Thus a plurality of time observations of single sheets is controlled dependent on the deviation. In these known printers or copiers, a plurality of time observations of relative times are thus necessary that intervene in the individual control workflows and are provided by the controllers of the structural groups of the printer or copier. In particular in high-capacity printers and high-capacity copiers with a printing or, respectively, copying speed of $\geq$ 50 sheet DIN A4 per minute with a plurality of paper paths, a plurality of sensors and actuators are necessary in order to ensure both the high printing speed and a high print quality. Very elaborate and powerful controllers are in particular necessary for these high-capacity printers copiers. Further sensors are necessary in order to further improve the print quality of these printers or copiers and primarily in order to further increase the printing speed, whereby the evaluation of the sensor signals must occur with a higher precision with increasing printing speed of the printer or copier. However, these complex control tasks are only to be realized with a significant effort.

Such known high-capacity printers are, for example, specified in the international patent application [sic] WO/18054 and WO98/18052, from which a high-capacity printer with two printing groups for printing of single sheets is known. The described printers can be operated in at least two operating modes, whereby the transport path of the single sheet through the pritter [sic] is established by the operating mode. The printers have a plurality of sensors and actuators for control of the paper transport and of the printing process.

It is the object of the invention to specify methods and devices for control of a printer in which complex control events can also be realized relatively simply and with a high precision in the printer or copier. Furthermore, it is the object of the

Figure 14 a schematic representation of the printer according to Figure 14, whereby the paper paths of a simplex operating mode of the printer are shown; and

Figure 15 a table in which is shown a workflow upon switching of the operating modes.

A feeder unit of a high-capacity printer with a printing speed of up to 160 sheet DIN A4 per minute is shown in Figure 1. The feeder unit has four reservoir trays Tray_A, Tray_B, Tray_C, Tray_D from which single sheets are alternately extracted. Furthermore, the feeder unit can be supplied with single sheets in the direction of the arrow P1 from a subsequent feeder unit (not shown). These supplied single sheets are transported until the light barrier LS9 with the aid of the roller pairs WP13, WP12, WP11, WP10. The single sheet is subsequently transported into the printer (not shown) in the direction of the arrow P2 with the aid of the roller pair WP9. The roller pairs WP9 through WP 12 are driven by a step motor SM9, such that the single sheet is conveyed by the feeder unit with a constant speed V_{TR}.

A stack with single sheets of a preset paper format is respectively present in the reservoir trays Tray_A, Tray_B, Tray_C, Tray_D. The reservoir trays Tray_A, Tray_B, Tray_C, Tray_D respectively comprise a transport system that raises the stack of single sheets located in the respective reservoir tray such that the uppermost sheet of the respective stack is arranged at a predetermined height below the suction belt SB_A through SB_D of the reservoir tray Tray_A through Tray_D. The suction belt SB_A is driven with the aid of the step motor SM1B for extraction of a page from the reservoir tray Tray_A such that the uppermost single sheet is supplied to the roller pair WP1, whereby the suction belt SB_A accelerates the single sheet to a transport speed V_{INPUT}. The single sheet is forwarded with the speed V_{INPUT} with the aid of the roller pair WP1. The point in time of the arrival of

temporal sequence, whereby an exact sheet separation between successive single sheets is generated dependent on the constant transport speed V_{TR}. This is also possible in a simple manner via the inventive feeder unit when the successive single sheets are extracted from different reservoir trays and/or have different paper format.

As already described in connection with the reservoir trays Tray_A and Tray_B, the uppermost single sheet of the reservoir tray Tray_C is extracted from this with the help of a suction belt SB_C and accelerated to a feed speed V_{INPUT}. The suction belt SB_C is driven with the aid of a step motor SM3B. The arrival time at the light barrier LS3 is compared with a desired point in time previously determined by a control unit of the feeder unit. Dependent on the comparison result, the control unit determines the point in time at which the roller pair WP3 reduces the feed speed V_{INPUT} to the transport speed V_{TR}. It is thereby achieved that the single sheet extracted from the reservoir tray Tray_C arrives at the light barrier LS9 at a predetermined desired point in time. However, in contrast to the reservoir tray Tray_B and the reservoir tray Tray_A, no regulation occurs in the extraction of the single sheet from the reservoir tray Tray_C, since only a desired point in time is recorded with the aid of the light barrier LS3 and not with two light barriers respectively arranged along the transport path at an interval, as this occurs with the reservoir trays Tray_A and Tray_B. However, if a deviation from the preset desired point in time is established in the comparison of the arrival point of time of the single sheet extracted from the reservoir tray Tray_C at the light barrier LS9, for subsequent single sheets extracted from the feed tray Tray_C the point in time for reduction of the feed speed V_{INPUT} to transport speed V_{TR} by the roller pair WP3 is changed such that these subsequent single sheets extracted from the reservoir tray Tray_C then arrive at the light barrier LS9 at the point in time predetermined for these sheets. This can, for example, occur via an offset value and/or via a correction factor. A superior regulation thus occurs for subsequent single sheets.

downstream from the respect reservoir tray until the transfer of the single sheet to the printer in the direction of the arrow P2, only the position deviations that occur in the extraction of the single sheet from the respective reservoir tray must be taken into account in the sheet adjustment in the feeder unit. This inventive sheet adjustment enables further desired points in time of the single sheet to also be exactly established in the subsequently-arranged printer and to be used for the entire printer control, since the transport points in time of the single sheets to the printer are very exactly maintained by the feeder unit 10. The paper paths of different lengths of the single sheets from the different reservoir trays Tray_A, Tray_B, Tray_C, Tray_D to the light barrier LS9 are taken into account in the determination of the desired points in time. The sheet separations are controlled and regulated with high precision with the aid of the desired points in time via the exact arrival points in time of successive single sheets.

Figure 2 shows a block diagram with control units of the printer. Single-sheet-related information is determined from a print data stream with the aid of a controller 39. The same elements have the same reference characters. This single-sheet-related information is transferred to a main controller 44 with the aid of an HSCX bus 43. This information contains what is known as the side applications for sides to be printed and single sheets to be printed. The main controller 44 translates this information into control data. The main controller 44 supplies these control data to subordinate controllers 48 through 58 with the aid of a second HSCX bus system 46. The subordinate controllers 48 through 58 respectively have a time control unit with a 32-bit counter as a timer, whereby all time control units of the printer are synchronized and are clocked with the aid of the same clock signal. The clock signal is generated by the main controller 44 and transferred to the timers of the control units 48 through 58 via a clock signal line.

The control data that are generated by the main controller 44 for the subordinate controllers 48 through 58 contain the side number of the side to be printed, the paper format (especially the paper length and the paper width), the toner reservoir

concluded at the point in time T23 at which the leading edge of the single sheet X reaches the roller pair WP5.

As already described in connection with Figure 1, the arrival time of the single sheet X at the light barrier LS5 is detected and compared with a further desired point in time. If a deviation of the arrival point in time from the desired point in time exists, a further correction is achieved via a temporary speed change of the transport speed of the single sheet X with the aid of the roller pair WP5, such that the single sheet X subsequently arrives at the light barrier LS9 at a predetermined point in time. Due to the exactly controlled or, respectively, regulated arrival time of the single sheet at the light barrier LS9, a predetermined separation between the successive single sheets results for successive single sheets due to the constant transport speed V_{TR} and the temporally-offset arrival of the single sheets at the light barrier LS9. This separation is also designated as a sheet separation or a gap. Such a position control of the single sheet controlled with the aid of desired points in time is high-precision and can also be implemented at other locations of the printer, for example before a printing group or before output of the print pages from the printer. The possible adjustment region thus corresponds to the span of time between the point in time T23.1 and the point in time T23.3. In other exemplary embodiments, the point in time T23.3 is not located in the middle of the adjustment range, but rather is asymmetrically shifted in the adjustment range, preferably in the direction of the point in time T23.1.

The uniform acceleration of the single sheet X to the feed speed V_{INPUT} is also designated as a ramp acceleration. The uniform reduction of the feed speed V_{INPUT} to the transport speed V_{TR} likewise ensues in the form of a ramping. Due to the preset accelerations and speeds, the single sheet X has covered a section S1 at the point in time T22, a section S2 at the point in time T24 and a section S3 at the point in time T25.

be used for further control purposes. To monitor a desired point in time beyond the 11.93 hours, a counter formed as software by the time control unit 68 is counted further with the aid of the interrupt I8. The low-order 16-bit [sic] of a 32-bit desired value are stored in the job storage CC18 and the upper 16-bit [sic] of the 32-bit desired value are stored in the storage CC19.

A comparator C1 compares the 16-bit value stored in the storage CC18 with the current count value of a timer T7. The clock signal of 100 kHz of the central clock pulse generator of the printer is likewise supplied to the timer T7. Upon reaching and/or exceeding the low-order 16-bit part of the 32-bit desired value, the comparator C1 outputs an interrupt signal T18 via the current count value of the counter T7. The comparator C2 continuously compares the upper 16-bit value (stored in the storage CC19) of the 32-bit desired value with the current count value of the counter T8. The comparator C2 outputs in [sic] interrupt signal T19 given agreement or excess of the desired point in time stored in the storage CC19. If the count values of the counter T7 and T8 respectively agree with the desired values stored in the storages CC18 and CC19, the desired point in time has been reached. A provided control action is executed by a control unit of the printer, for example via an interrupt of the time control unit 68 according to Figure 6. The time control unit 68 according to Figure 6 can, for example, be very simply realized with the aid of what is known as the capture/compare unit of the 16-bit microprocessors C164CI and C167CR by the firm Infineon.

If, for example, the point in time for reduction of the feed speed V_{INPUT} to transport speed V_{TR} should be monitored, this point in time is written into the storages CC18 and CC19 as a 32-bit value. Upon reaching the desired point in time for reduction of the feed speed V_{INPUT} to transport speed V_{TR}, an interrupt signal I18 is output by the comparator C1 and an interrupt signal I19 is output by the comparator C2. Corresponding control events to reduce the speed are controlled by the control units of the printer based on both of these interrupt signals I18, I19. A program routing in the printer is preferably provided that, in a preset operating state of the

printer, resets the current count values of all time control units 68 and starts these again at the same point in time.

Figure 7 shows a feeder unit 11 that, in addition to the elements of the feed unit according to Figure 1, [sic] sensors for position monitoring of housing parts of the feeder unit 11 to be opened. Such housing parts are, for example, what are known as air vanes of the feeder unit 11 that can be opened to extract single sheets as a result of a paper jam or for maintenance tasks. The position sensors are, for example, end switches that monitor the closed state of these housing parts, for example these air vanes. The position monitoring sensors are designated with S1 through S12 in Figure 7. However, the feeder unit 11 has further air vanes whose position is not monitored with the aid of sensors. These air vanes not monitored with sensors are mechanically secured with the monitored air vanes such that they are only to be opened after opening of a monitored air vane.

Figure 8 shows a plurality of processes for control of the feeder unit 11 according to Figure 7. These processes, which are also designated as tasks in Figure 8, are executed by a controller in parallel or in a multitasking operation. The individual processes, i.e. the individual tasks, are executed independent of one another. The operating system or the firmware of the controller controls the parallel execution of the processes and the simultaneous execution of the processes in multitasking or multiprocessor operation.

In the multitasking operation, the simultaneity refers to an execution strategy in which processing capacity of the processor is respectively allocated among the jobs for a short time. This short time is also designated as a timeslot or timeslice. For a plurality of processes, it thus has the appearance as if these processes are being executed simultaneously by the controller. For example, the operating system PXROS by the firm HIGHTEC can be used for execution of a plurality of parallel processes, [sic] that it also enables a program to be started in different tasks with varying parameters. The same program can be started thirteen times in different

tasks to monitor the light barriers LS1 through LS13, whereby these thirteen tasks and further tasks are executed in parallel.

A superordinate module 32 determines information from the print data stream that concern a single sheet X to be printed and establishes desired point in times for control of the single sheet. This superordinate module 32 can, for example, be executed as a monitoring module 12 according to Figure 4 or as an administration component 66 according to Figure 2. The superordinate module 32 transfers to the time process 34 the values of all desired points in time that concern the valves V1 through V3 and the light barriers LS2, LS7 and LS9. The values of the desired points in time are related to the current time value of a timer. A plurality of timers are preferably provided in the printer (whereby each control unit has its own timer) that are synchronized with the aid of a synchronization event and that are activated by a uniform clock signal. These timers are preferably executed as 32-bit counters that are clocked with a clock of 100 kHz. The count value of the counter of the timer thus forms the time normal of the printer to which all desired points in time and real points in time correspond. The desired points in time are established via determination of a count value of the counter. Upon occurrence of an event, for example upon arrival of a sheet edge at a light barrier, the light barrier outputs a sensor signal. The current counter state of the timer is detected as an arrival point in time or, respectively, as a real point in time and (as already described further above) compared with the established desired point in time.

The desired points in time transferred to the time process 34 contain control points in time for control of the valves V1, V2 and V3 for extraction of the single sheet C from the reservoir tray Tray_B as well as points in time for monitoring of the paper path of the single sheet X up to the light barrier LS9 with the aid of the light barriers LS2, LS7 and LS9. The desired points in time are transferred to the time process 34 with the aid of a message.

point in time is identified that is associated with an action to be executed next. The time process 34 transfers to the time control unit a desired count value that corresponds to the desired point in time. After reaching the desired point in time, the time control unit generates an interrupt. The time process 34 generates a message for the valve process based on the interrupt and transfers to the valve process all still-current desired points in time as well as the information that the point in time to open the valve V2 has been reached. The valve process thereupon opens the valve V2 and sends a next message with all currently-remaining desired points in time to the time process 34, whereby a desired point in time for opening of the valve V1 is identified.

The point in time for opening of the valve V1 is transmitted by the time process 34 to the time control unit, which initiates an interrupt after reaching the desired point in time. The time process 34 generates a message for opening of the valve V1 based on the interrupt and transfers this message to the valve process together with the further desired points in time. The valve process opens the valve V1. The valve process subsequently transfers the remaining desired points in time to the time process 34 with the aid of a message, whereby the desired point in time for closing of the valve V3 is identified.

The time process 34 transfers the desired point in time for closing of the valve V3 to the time control unit. Upon reaching the desired point in time, the time control unit initiates an interrupt, whereby the time process 34 transfers to the valve process V3 a message with the remaining desired points in time and information for closing of the valve V3. The valve process closes the valve V3. The valve process subsequently generates a message with the remaining desired points in time, whereby the remaining point in time for closing of the valve V2 is identified. The time process 34 transfers the identified desired point in time to the time control unit, which initiates an interrupt after reaching the desired point in time. Based on the interrupt, the time process 34 generates a message with the remaining

desired points in time and the information for closing of the valve V2 for the valve process.

The valve process closes the valve V2 and generates a message with the remaining desired points in time and transfers this message to the time process, whereby the desired point in time for closing of the valve V1 is identified. The time process 34 transfers the desired point in time for closing of the valve V1 to the time control unit, which outputs an interrupt signal to the time process 34 after reaching the point in time. Based on the interrupt, the time process 34 generates a message with the remaining desired points in time and information regarding the closing of the valve V1 for the valve process. The valve process closes the valve V1 and generates a message with the remaining desired points in time and transfers this to the sensor process 38 to overcome the light barrier LS2. The valves V1 through V3 of the valve process are contained in the reservoir tray B for extraction of a single sheet. Identical valve processes and time processes that are executed in parallel with the valve process and the time process 34 are provided for the feeder trays Tray_A, Tray_C, Tray_D.

From the desired points in time transmitted by the valve process 36, the sensor process 38 determines a desired point in time at which the leading edge of the single sheet X must at the latest have arrived at the light barrier LS2. The sensor process 38, like the further sensor processes 40 and 42, serves to determine paper path errors. A high-precision time monitoring as it is used (with the help of an already-described time control unit) in the feeder unit [sic] 10, 11 of the printer to control actuators and determine control points in time is not necessary for a paper path monitoring.

The sensor process 38 contains a time monitoring for monitoring of the desired time for arrival of the leading edge of the sheet of the single sheet X at the light barrier LS2. The sensor process 38 queries the current time in the time process 34 and forms a time difference with the aid of the transmitted desired value. This

time difference is detected and monitored with the aid of a counter. After the passing of this count time, the maximum allowable paper delay until the light barrier LS2 is thus exceeded and the sensor process 38 generates an error message. Upon arrival of the leading sheet edge [sic] the light barrier LS2, a light barrier control unit generates an interrupt and executes an interrupt service routing. The interrupt service routing transfers a signal to the sensor process 38 via which the counter of the sensor process 38 is stopped or reset. Thus no error message is generated given timely arrival of the leading sheet edge of the single sheet X at the light barrier LS2.

After reaching the desired point in time of the sensor process 38, the sensor process 38 transfers (with the aid of a message) the remaining desired points in time to the sensor process 40 for monitoring of the light barrier LS7. In the same manner as the sensor process 38, the sensor process 40 determines a delay time before which the leading edge of the sheet must arrive at the light barrier LS7. Given an untimely arrival of the leading sheet edge at the light barrier LS7, the sensor process 40 generates an error message. The desired point in time is monitored by the sensor process 40 with the aid of a counter.

If the leading sheet edge of the single sheet X arrives at the light barrier LS7 in a timely manner, a monitoring unit generates an interrupt and executes an interrupt service routing. The interrupt service routing generates a signal for resetting or, respectively, stopping the counter of the sensor process 40. The sensor process 40 subsequently transfers the desired value of the maximum allowable desired point in time for arrival of the leading sheet edge at the light barrier LS9 to the sensor process 42. The sensor process 40 monitors this desired value in the same manner as already described for the sensor process [sic] 38 and 40. If the single sheet arrives at the light barrier LS9 in a timely manner, the sensor process LS9 [sic] generates a message and transfers this to the superordinate module 32. If a sensor process 48, 40, 42 determines an error, the respective sensor process 38, 40, 42

uniformly to feed speed V_{INPUT}. The valve V1 and the valve V2 remain open up to the point in time T4, i.e. approximately until 300 ms after T0, in order to ensure that only the upper single sheet is removed from the reservoir tray Tray_A with the aid of the suction belt SB_A. At the point in time T5 the single sheet has already been transferred to the roller pair WP1 and the step motor SM1B is stopped. The time diagram according to Figure 10 shows the time controller of the valves V1, V2, V3 and of the step motor SM1B given a transport speed V_{TR} of 847 mm/s, at which 160 single sheets in DIN A4 paper format are supplied to the printer per minute by the feeder unit 11 according to Figure 7.

A speed/time diagram is shown in Figure 11 that shows the speed curve of a single sheet given the extraction from a reservoir tray Tray_A of the feeder unit 11 according to Figure 7. At the point in time T10, the single sheet rests against the suction belt SB_A and the step motor SM1B to drive the suction belt SB_A is started. The step motor SM1B is thereby activated such that the suction belt SB_A is uniformly accelerated during the time span t10 with an acceleration of 50 m/s² to a speed of 3.5 x v_0. The speed v_0 is 338.6 mm/s in the present exemplary embodiment. The single sheet is forwarded with a constant speed 3.5 x v_0 up to the point in time T12. The point in time T11.1, at which the leading sheet edge of the single sheet reaches the light barrier LS1, is detected and compared with a predetermined desired point in time. Dependent on the comparison result, the time t11.1 (and thus the point in time T12) is established at which it is begun to reduce transport speed of the single sheet from 3.5 x v_0. The speed 3.5 x v_0 is the feed speed V_{INPUT} of the single sheet. At the point in time T12, the single sheet is uniformly negatively accelerated (i.e. braked), with an acceleration of 40 m/s², to the transport speed V_{TR} of 2.5 x v_0. At the point in time T13, the single sheet has reached the normal transport speed V_{TR} 2.5 x v_0 and is forwarded with this speed up to the point in time T14, at which it reaches the transfer light barrier LS9. The following calculations result for the time spans T10 through T13:

v_0= 338.6 mm/s; 1_1 = 50 m/s²; a_3 = 40 m/s²;

In another exemplary embodiment, it is also advantageous to provide as an output signal of the time control process at least one interrupt signal that activates an interrupt service routing in the appertaining controller/in the appertaining controllers.

A printer 73 with a first printing group 74 and a second printing group 76 is shown in Figure 13. The printer 73 is operated in a first operating mode. A single sheet (not shown) is supplied to the printer 73 in the direction of the arrow P10. Possible transport paths of the single sheet through the printer 73 are shown with dotted lines, whereby the supplied single sheet is passed on these transport paths to the printing group 74 and/or to the printing group 76 for printing of the single sheet with one or more print images. The actual transport path of the supplied single sheet in the first operating mode is shown indicated by the arrows P12 through P15 and as a solid line.

The single sheet supplied to the printer 73 in the direction of the arrow P10, for example from a feeder device 11, is directed to the printing group 74 and is printed by this on the front side with a first print image. The single sheet is subsequently forwarded in the direction of the arrows P13 and P14 and subsequently in the direction of the arrow P15 to the printing group 76. The printing group 76 generates a second image on the back side of the single sheet. In the region of the arrows P14 and P15, the single sheet is turned in order to supply it to the printing group 76 with a back side facing towards the printing group 76. In this first operating mode shown in Figure 13, the printer 73 can print successive front side and rear side [sic] of the supplied single sheet, for example in the same color.

The printer 73 according to Figure 13 is shown in Figure 14, whereby the printer 73 is shown in a second operating mode for one-sided printing of single sheets. Identical elements have the same reference characters. The single sheets are supplied to the printer 73 in the direction of the arrow P10, as already described in connection with Figure 14. At a gate 78, the supplied single sheet can be

transported to an upper transport path along the solid line in the direction of the arrow P17 or along the solid line in the direction of the arrow P18 to a lower paper path through the printer 73. If a first single sheet is transported along the lower paper path P18 through the printer 73, it is thereby supplied to the printing group 74 which generates a predetermined first print image on the first single sheet. If a second single sheet is transported along the upper paper path in the direction of the arrow P17 through the printer 73, it is supplied to the printing group 76 which generates a second print image on the supplied side of the second single sheet. The single sheets are output from the printer 73 in the direction of the arrow P16 after the printing.

If the printer 73 is operated in the operating mode according to Figure 14 and a plurality of single sheets should be printed in succession, it is advantageous to transport the first single sheet along the lower paper path through the printer 72 and the second single sheet along the upper paper path through the printer 73. An optimal loading of the printer 73 for one-sided printing of print pages is thereby achieved, since the printing groups 74, 76 can essentially print different single sheets in parallel.

With the help of the supplied print data, the main controller 64 determines the transport path of the single sheet through the printer 73 and establishes the operating mode in which the printer 73 is operated for printing of the single sheet. A printer with two printing groups and a method for operation of such a printer is known from the document WO 98/18052. The printer can thereby be operated in a first operating mode, what is known as a duplex operating mode in which the first printing group generates a first print image on the front side of a supplied single sheet and the second printing group generates a second print image on the back side of the single sheet.

In a second operating mode, what is known as a fast simplex operation mode, a first single sheet is supplied to the first printing group 74 on a first transport path

for pritting [sic] of the front side and a second single sheet is supplied to the second printing group 76 on a second transport path for printing of the front side of the second single sheet. It is thereby possible to essentially simultaneously print two one-sided single sheets to be printed and to increase the printing speed in the one-sided printing of single sheets relative to the first duplex operating mode. However, a switch-over time is necessary to switch from the first operating mode to the second operation mode as well as from the second operating mode to the first operation mode. A device and a method in order to shorten the switch-over time is described in the patent application (submitted at the same time as this patent application) by the same applicant with the file number DE 102 50 185.8. However, minimum sheet separations must be maintained in the switch-over of the operating modes. The content of this patent application is incorporated by reference into the present specification.

If a single sheet is printed on both sides in the first operating mode and subsequent single sheets should only be printed on one side, the switch from the first operating mode to the second operating mode is inventively only made when a preset number of successive single sheets is to be printed one-sided. The optimal number to be preset is thereby [sic] on the design of the printer 73, in particular on the paper format, on the necessary minimum sheet separation in the switch-over between the operating modes and on the printing speed differences between the one-sided printing of single sheets in the duplex operating mode and in the fast simplex operating mode. In both the calculation and in test series with the printer 73, it has proven to be advantageous to preset a value in the range between four and twenty DIN A4 single sheets for the number to be set of the pages to printed one-sided. The value ten has proven to be particularly advantageous.

A table is shown in Figure 15 in which the operating mode selection of the printer 73 is shown dependent on the number of the pages to be printed in the respective operating mode. The single sheets to be printed in succession are specified in a consecutive numbering in column 1 of the table. Whether the respective sheet is to

be printed one-sided or on both sides is specified in column 2 of the table according to Figure 15. The tentatively selected transport path is specified in column 3 of the table. An explanation for selection of the transport path of the respective single sheet is specified in column 4 of the table. The paper paths changed after a re-evaluation (i.e. after reaching the determined number of successive single sheets to be printed one-sided) are specified in column 5 of the table and the operating mode in which the respective single sheet is printed by the printer 73 is specified in column 7 of the table.

The first single sheet 1 is to be printed one-sided. A transport path is selected on which the single sheet 1 is to be printed one-sided by the printing group 74. The single sheet 2 is likewise to be printed one-sided. A transport path is selected in which it is transported to the printing group 76 and printed by this. The third single sheet is likewise to be printed one-sided and is transported on the same transport path as the single sheet 1 through the printer 73 to the printing group 74 and printed one-sided by this. The printing of the single sheets 1 through 3 occurs in the operating mode 2, i.e. the fast simplex operating mode.

The fourth single sheet 4 is to be printed double-sided. A switch must thus be made from the operating mode 2 to the operating mode 1 for two-sided printing, whereby the single sheet 4 is transported on the transport path through the printer 73 on which it is transported with the front side to the printing group 74 and with the back side to the printing group 76. The single sheet 5 is to be printed one-sided. A control unit for selection of the operating mode checks whether the preset number of ten successive single sheets to be printed one-sided has already been reached, which number is necessary in order to switch the operating mode from the operating mode 2 to the operating mode 1. The single sheet 5 is the first single sheet to be printed one-sided after the single sheet 4 to be printed double-sided. As specified in column 3, the operating mode 2 is thus maintained, whereby only the printing group 74 or only the printing group 76 generates a print image on the front side of the single sheet 5.

thus has a leader of single sheets to be printed. The control unit associates a transport path with each sheet for generation of the desired print image or, respectively, of the desired print images on the single sheet and establishes a sheet separation from the preceding single sheet. This occurs at least before the appertaining single sheet is supplied to the printer 73 or, respectively, before the single sheet is extracted from a reservoir tray Tray_A through Tray_D of the feeder unit 11 of the printer 73. The pritting [sic] of a single sheet is thereby considered as a printing event. Via the analysis by the control unit of the pending pages contained in the leader, the evaluation for operating mode selection (explained in connection with Figures 13 through 15) can occur in that the performance of the printer 73 can be significantly increased. The switch between the operating modes occurs with an increase of the printing speed relative to conventional printers [sic] with a reduction of the wear of the components participating in the operating mode switch.

The inventive method for switch-over of the operating modes is then particularly to be advantageously used when a continuous transport of the single sheets occurs through the printer 73 without what are known as stop positions being contained in the transport path. A significant increase of the printing speed can in particular be achieved in such printers.

In the printer according to Figures 13 and 14, it is advantageous to stored the print data of at least the preset number in a storage of the printer, which data are then evaluated by the control unit.

Although preferred exemplary embodiments are shown and described in detail in the drawings and in the preceding specification, this should be viewed as purely exemplary and not as limiting the invention. It is noted that only the preferred exemplary embodiments are shown and described, and all variations and modifications that presently and in the future lie within the scope of protection of the invention should be protected.